

DERWENT-ACC-NO: 2000-259909

DERWENT-WEEK: 200023

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TITLE: Removal of powder coating  
from bolt hole and hub hole  
surface of aluminum wheel,  
involves powder coating  
suction removal from bolt  
holes and removal by brushing  
and accompanied by suction  
removal on hub hole

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ABSTRACTED-PUB-NO: JP2000033331A

BASIC-ABSTRACT:

NOVELTY - The powder coating is removed from many bolt holes surfaces and a hub hole surface before baking of a wheel (1). A controller (16) controls a pair of robots (18,19) to perform a first process of removal by suction and a second process of brushing followed by suction removal on the bolt hole surfaces and

the hub hole surface. DETAILED DESCRIPTION - An electrostatic powder coating

is performed on the wheel surfaces. The powder coating from the bolt hole

surfaces and the hub hole surface is removed before the baking process of the

powder coated wheel. A powder coating removal apparatus (20A) for removing the

powder coating from the bolt hole surfaces, is provided with a sensor (14)

which outputs a position detection signal of the bolt holes to the controller.

The controller controls each robot holding position of the removal apparatus

(20A) to match the bolt hole surface detected on a CRT. A removal apparatus

(20B) for removal of powder coating from the hub hole inserts the brush from a disc back side and rotates the removal apparatus portion. Then the suction

removal of the powder coating adhering to the hub hole surface, based on the control output signal from the controller. An INDEPENDENT CLAIM is also

included for apparatus for removal of powder coating.

USE - For removing powder coating from bolt hole surfaces and hub hole surface of aluminum wheel.

ADVANTAGE - Avoids requirement of posture alteration of wheel and masking process of hole surfaces. Prevents problems of masking material dropping by not using masking material. Prevents omission of coating by the dropping of masking material. DESCRIPTION OF DRAWING(S) - The figure shows an outline of the apparatus showing the powder coating removal process. (1) Wheel; (14) Sensor; (16) Controller; (18,19) Robots; (20A,20B) Powder coating removal apparatus.

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: REMOVE POWDER COATING BOLT HOLE HUB HOLE SURFACE WHEEL POWDER

COATING SUCTION REMOVE BOLT HOLE REMOVE BRUSH ACCOMPANIED SUCTION REMOVE HUB HOLE

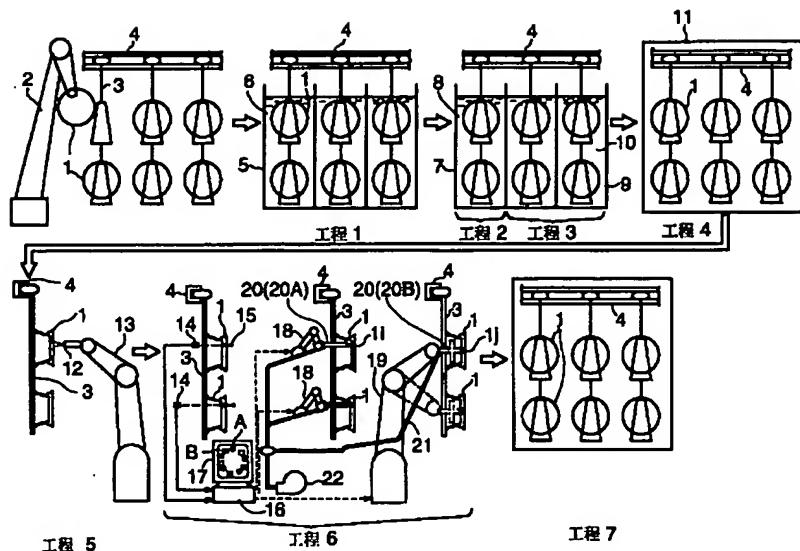
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EPI-CODES: X25-K05;

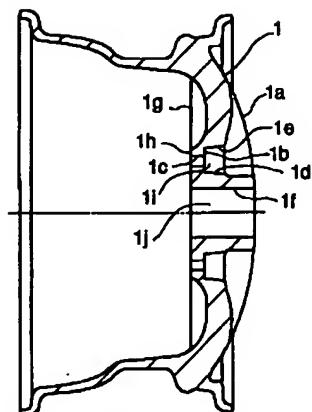
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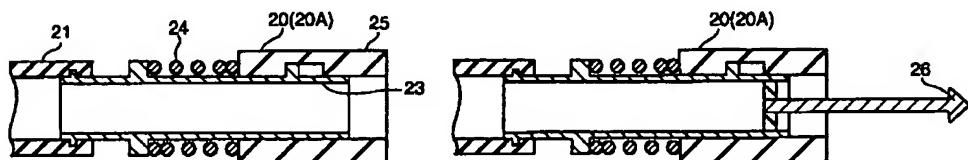
【図1】



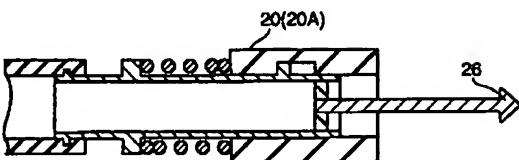
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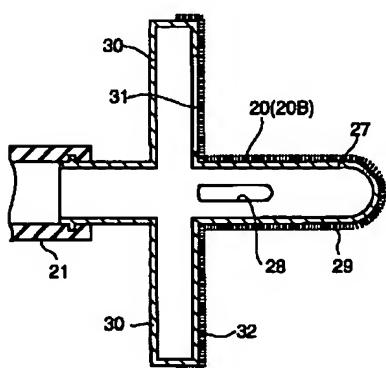
【図3】



【図4】



【図5】



フロントページの続き

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the removal approach of the powder coatings from an aluminum wheel hole (bolthole and/or hub hole) side, and equipment.

**[0002]**

**[Description of the Prior Art]** Rust proofing and an exterior, and paint are performed to the design side of an aluminum wheel. However, paint is not performed to the hub anchoring side of the bearing surface of a bolthole, a bolthole inside, the contact surface with the axle hub of a hub hole, and the tooth backs of the disk section on fitting with a hub on bolt slack prevention. Conventionally, in advance of solvent paint or the paint by powder coating, masking is performed to a non-painted surface and masking is removed after paint. Masking is performed by making a wheel into the posture which turned the axis in the direction of a vertical, and stuffing it into a hole with a masking member with handicraft or a robot. In paint Rhine, on the relation of pretreatment (processing of chemical conversion, rinsing, etc.), since a horizontal hangs a wheel axis to a hanger in the condition of having turned almost horizontally and a wheel is conveyed, the process to which an axis changes the posture of a wheel into the condition of a vertical from a horizontal or an almost level condition is needed just before a masking process, and handicraft or a robot is performing this conventionally.

**[0003]**

**[Problem(s) to be Solved by the Invention]** However, there is the following problem in the conventional method of application.

\*\* A wheel posture modification process is needed just before a masking process. When making a posture change manually, it moves against \*\* people-ization, and when a robot performs, a facility becomes so large and robot installation tooth-space part paint Rhine is enlarged.

\*\* Cleaning \*\* of masking after a cure on the characteristic problem by using a masking member in masking, for example, the omission prevention from the wheel of a masking member, and paint is needed.

\*\* In the case of masking, in the case of solvent paint or powder coating, the problem that paint is impossible for the part which serves as a shadow of masking in the part for which paint is needed arises.

\*\* In the case of masking, in solvent paint, the problem of a coating not falling out for masking may arise. without masking is used for the purpose of this invention on the assumption that powder coating, and without it changes a wheel posture -- after aluminum wheel powder coating -- before coating printing -- from the hole front face of an aluminum wheel -- since -- it is in offering the removal approach of the powder coatings from an aluminum wheel surface with hole and equipment from which powder coatings are removable.

**[0004]**

**[Means for Solving the Problem]** This invention which attains the purpose of above-mentioned this invention is as follows.

- (1) Where it carried out electrostatic coating of the powder coatings and an aluminum wheel axis is

sideways carried out for the aluminum wheel before coating printing later. The process conveyed to the removal station of the powder coatings adhering to an aluminum wheel hole front face. A sensor detects the location of an aluminum wheel on the basis of a bolthole. A sensor output to a control unit Delivery, The location of a coating stripper is corrected with a control unit so that the hole of the aluminum wheel with which the location of the coating stripper of the powder coatings which have adhered to the aluminum wheel hole front face on CRT of this control unit was detected may be suited. The process which sends the output of this control device to the control device of each robot holding each coating stripper, The robot of the coating stripper of the powder coatings adhering to a bolthole with the output of said control unit The 1st coating removal process which performs carrying out suction removal of the powder coatings which the coating stripper of the powder coatings which controlled and have adhered to the bolthole was made to approach a bolthole from a disk tooth back, and have adhered to the bolthole to all the boltholes of this aluminum wheel, Approach [ stripper / of the powder coatings which controlled the robot of the coating stripper of the powder coatings adhering to a hub hole by the output of said control device, and have adhered to the hub hole / a part of / which is performed after the 1st coating removal process or in a front / coating / tooth back / disk ] in a hub hole and -- this -- the 2nd coating removal process which carries out the brush of the powder coatings which inserted, were rotated and have adhered to the hub hole, and carries out suction removal -- since -- the removal approach of the powder coatings from the becoming aluminum wheel surface with hole.

(2) the process which the coating stripper of the powder coatings adhering to the bolthole of an aluminum wheel is made to approach a bolthole from a disk tooth back, is contacted, and carries out the seal of between disk tooth backs to a coating stripper, and the process which carries out suction removal of the powder coatings which attracted air through the bolthole by the coating stripper, and have adhered to the bolthole -- since -- the removal approach of the powder coatings from the becoming aluminum wheel surface with hole.

(3) the process which carries out the suction removal of the powder coatings which have adhered to a hub hole the process which make a part of coating stripper of the powder coatings adhering to the hub hole of an aluminum wheel approach a hub hole from a disk tooth-back side, and inserts it in it, and by rotating a coating stripper to the circumference of the axis, dropping the powder coatings which have adhered to the hub hole with the brush of a coating stripper, and drawing in through the slit of a coating stripper -- since -- the removal approach of the powder coatings from the aluminum wheel surface with hole become.

(4) The stripper of the powder coatings from an aluminum wheel surface with hole which has the seal member which carries out the seal of between an aluminum wheel and suction opening when spring energization is carried out and suction opening is approached by the bolthole of an aluminum wheel in the direction which is supported movable to suction opening which it connects with a reduced pressure pump through a hose, it is supported by the robot, and is approached by the bolthole of an aluminum wheel, and this suction opening, and jumps out to suction opening.

(5) The stripper of the powder coatings from an aluminum wheel surface with hole which has the hollow cylinder section which is connected to a reduced pressure pump through a hose, is supported by the robot, and is inserted in the hub hole of an aluminum wheel rotatable, and by which the tip was blockaded, the slit formed in this hollow cylinder section, and the brush attached in the external surface of this hollow cylinder section.

[0005] The above (1) In the stripper of the powder coatings from the removal approach of the powder coatings from the aluminum wheel surface with hole of - (3), the above (4), and the aluminum wheel surface with hole of (5), since the powder coatings applied to the aluminum wheel hole front face are baked and suction removal is carried out in front, an aluminum wheel can be attracted where an axis is leveled and the posture modification process for turning the axis of an aluminum wheel to a vertical like [ in masking ] and the robot for it are not needed. Moreover, since masking is not used, there is also no problem of omission of a masking member, the painting defect of the part of the shadow of a masking member, and the poor omission of a solvent coating.

[0006]

[Embodiment of the Invention] The removal approach of the powder coatings from the aluminum wheel surface with hole of this invention example and equipment are explained with reference to drawing 1 - drawing 5 . Drawing 1 shows the painting process of an aluminum wheel in order of the process. the painting process of an aluminum wheel -- the aluminum wheel hole of the chemical conversion process of a process 1, the \*\*\*\* process of a process 2, the rinsing process of a process 3, the desiccation process of a process 4, the electrostatic-coating process of a process 5, and a process 6, the removal process of the powder coatings from the hub contact surface on the tooth back of a disk, and the printing process to the aluminum wheel of the powder coatings of a process 7 -- since -- it becomes.

[0007] The aluminum wheel 1 which finished to casting and machining is hooked on a hanger 3 by the robot 2, is in the condition which leveled the axis mostly in the horizontal, and is conveyed by conveyance conveyor 4. An aluminum wheel 1 is washed by chemical conversion being carried out and being immersed into the cleaning agent 8 in a series of \*\*\*\*\* 7 subsequently, being able to pull up subsequently, being immersed subsequently into the wash water 10 in a series of rinse tanks 9, and subsequently being able to pull up by being immersed into the chemical conversion liquid 6 in a series of chemical conversion cisterns 5, and subsequently being able to pull up. After washing, an aluminum wheel 1 is conveyed by conveyance conveyor 4, and is dried by the desiccation booth 11.

[0008] After desiccation, an aluminum wheel 1 is conveyed at a paint station, and electrostatic powder coating is carried out at a paint station. An aluminum wheel 1 is in a horizontal or the condition of being in the condition which leveled mostly, and it having been hooked on the hanger 3, having been hung by the conveyance conveyor 4, and having halted, about an axis. It is supported by the robot 13, and is moved, white (after printing changes clear) powder coatings are sprayed towards the front face of an aluminum wheel from the front of an aluminum wheel 1, and the paint gun 12 is applied to the design side of an aluminum wheel 1. At this time, in drawing 2 , a coating adheres not only to front 1a of an aluminum wheel 1 but to nut bearing-surface 1b, bolt shank insertion surface-with-hole 1c, bolt surface-with-hole 1e containing 1d of surfaces with hole for nut wearing, and 1f of hub surfaces with hole, and some coatings adhere also to 1h of hub contact surfaces which turn to a disk tooth back, are crowded, and contact the end face of the hub of an axle while on 1g of tooth backs of a disk. Adhesion extent of this adhesion coating is extent (extent removable if it draws in) removable before printing, if it rubs by hand.

[0009] In order to prevent the slack of a bolt, and in order to make the clearance between bolts below into a predetermined value, it is nut bearing-surface 1b. Powder coatings of bolt shank insertion surface-with-hole 1c and 1h of hub contact surfaces must be removed. Moreover, the powder coatings which have adhered to the hub peripheral face and the part which fits in among 1f of hub surfaces with hole must be removed on fitting with a hub peripheral face. The powder coatings of a powder-coatings removal need part are removed at a powder-coatings removal station, after that, an aluminum wheel 1 is conveyed by conveyance conveyor, while it had been missing from the printing process at the hanger, it is heated, and is baked, and paint of an aluminum wheel 1 completes it. The coating which was white until now as for after printing is cleared (transparence).

[0010] The removal approach of the powder coatings from the aluminum wheel surface with hole of this invention example and equipment are related with the removal process and equipment of powder coatings in the removal station of the powder coatings which are after electrostatic coating among painting processes, and have adhered to the aluminum wheel hole front face before coating printing among a series of processes.

[0011] By the removal approach of the powder coatings from the aluminum wheel surface with hole of this invention example, after carrying out electrostatic coating of the powder coatings, the aluminum wheel 1 before coating printing is in the condition which carried out the aluminum wheel axis sideways (almost level in a horizontal), and is conveyed at the removal station of the powder coatings adhering to an aluminum wheel hole front face.

[0012] At the removal station of powder coatings, a sensor 14 detects the location of the current aluminum wheel 1 on the basis of bolthole 1i. Detection of bolthole 1i irradiates light (for example, light of a fluorescent lamp 15) from the front-face side of an aluminum wheel, and is performed by detecting

with the photosensor 14 which has arranged the light which passes bolthole 1i to the tooth-back side of the disk of an aluminum wheel 1. The output of a sensor 14 is sent and inputted into a control unit (computer) 16. A control unit 16 corrects the location A of a coating stripper so that hole site B of the aluminum wheel with which the location A of the coating stripper 20 of the powder coatings which have adhered to the aluminum wheel hole front face on CRT17 was detected may be suited. The output of a control device 16 is sent to the control device of each robots 18 and 19 holding each coating stripper 20. Here, a robot 18 is a robot holding the coating stripper 20 (20A) which removes the powder coatings adhering to bolthole 1i, and a robot 19 is a robot holding the coating stripper 20 (20B) which removes the powder coatings adhering to hub hole 1j.

[0013] Subsequently, the robot 18 of the coating stripper 20 of the powder coatings adhering to bolthole 1i is controlled by the 1st coating removal process with the output of a control unit 16. Carrying out suction removal of the powder coatings which the coating stripper 20 (20A) of the powder coatings adhering to bolthole 1i was made to approach bolthole 1i from a disk tooth-back side, and have adhered to the field of bolthole 1i. It performs to all (when five boltholes are made in one aluminum wheel, they are the five pieces) bolthole 1i of an aluminum wheel 1. Still more specifically by the removal approach of the powder coatings from the bolthole front face of an aluminum wheel 1. Make the coating stripper 20 (20A) of the powder coatings adhering to bolthole 1i of an aluminum wheel 1 approach bolthole 1i from a disk tooth back, make it contact, and the seal of between disk tooth backs is carried out to the coating stripper 20. Attract air through bolthole 1i by the coating stripper 20, the powder coatings adhering to the field of bolthole 1i are made to exfoliate from the field of bolthole 1i by the flow of air, and suction removal is carried out.

[0014] Moreover, control the robot 19 of the coating stripper 20 (20B) of the powder coatings adhering to hub hole 1j by the output of a control device 16, and hub hole 1j is made to insert [ it approaches it for it and ] and rotate a part of coating stripper 20 of the powder coatings adhering to hub hole 1j from a disk tooth back at the 2nd coating removal process, the powder coatings adhering to hub hole 1j are brushed, and suction removal is carried out. Still more specifically by the removal approach of the powder coatings from the hub surface with hole of an aluminum wheel 1. Make a part of coating stripper 20 (20B) of the powder coatings adhering to hub hole 1j of an aluminum wheel 1 approach hub hole 1j from a disk tooth-back side, and it is inserted in it. The coating stripper 20 is rotated to the circumference of the axis, and suction removal of the powder coatings adhering to a hub hole is carried out by dropping the powder coatings which have adhered to hub hole 1j with the brush of the coating stripper 20, and drawing in through the slit of the coating stripper 20.

[0015] The 2nd coating removal process is performed after the 1st coating removal process or in a front. Moreover, the time amount which performs the 1st coating removal process using one set of the coating stripper 20 (20A) the time amount which performs the 2nd coating removal process using one set of the coating stripper 20 (20B), since it cuts in twice mostly. It doubles with the time amount which performs the 2nd coating removal process using one set of the coating stripper 20 (20B) as performs the 1st coating removal process using two sets of the coating strippers 20 (20A) mostly.

[0016] Below, the stripper 20 (20A, 20B) of the powder coatings from an aluminum wheel surface with hole of this invention example used at a coating removal station is explained with reference to drawing 3 , drawing 4 , and drawing 5 . As shown in drawing 3 , the stripper 20 (20A) of the powder coatings from the bolthole 1i front face of an aluminum wheel 1. The suction opening 23 which it connects with the reduced pressure pump (vacuum POMBU) 22 through a hose 21, it is supported by the robot 18, and is approached by bolthole 1i of an aluminum wheel 1, the seal member 25 which carries out the seal of between the disk tooth back of an aluminum wheel, and the suction opening 23 when it is energized with a spring 24 in the direction which is supported movable (a slide is possible) to the suction opening 23, and jumps out to the suction opening 23 and the suction opening 23 is approached by bolthole 1i of an aluminum wheel 1 -- since -- it becomes.

[0017] With this equipment, since the seal of between the disk tooth back of an aluminum wheel and the suction opening 23 is carried out by the seal member 25, when it draws in with the suction opening 23, the strong air flow which faces to the suction opening 23 arises from the front-face side of a wheel in

bolthole 1i, and the powder coatings adhering to nut bearing-surface 1b and bolt shank insertion surface-with-hole 1c exfoliate from a field, air flow is ridden, the suction opening 23 absorbs, and it is removed by this air flow. The removed coating is collected and reused. Since the powder coatings which have adhered to 1d of surfaces with hole for nut wearing among bolt surface-with-hole 1e are hard to be put in the style of [ strong ] air, it is hard to carry out suction removal, but since it is better for the coating of 1d of surfaces with hole for nut wearing to be unrelated to bolt slack, and to leave a rust-proofing top to adhesion, it is good with adhesion.

[0018] As shown in drawing 4, the stripper 20 (20A) of the powder coatings from the bolthole 1i front face of an aluminum wheel 1 may have further \*\*\*\*\* 26 which the tapering taper prolonged toward the front from the suction opening 23 attached. \*\*\*\*\* 26 is in the condition which carried out the seal of between a disk tooth back and the suction opening 23 by the seal member 25, when it is located ahead and air is attracted from nut bearing-surface 1b, there is and it makes the flow of air meet nut bearing-surface 1b. [ more much ] When there is \*\*\*\*\* 26, the powder coatings adhering to nut bearing-surface 1b can be removed certainly. However, when drawing out \*\*\*\*\* 26, it is necessary to make it \*\*\*\*\* 26 not caught in nut bearing-surface 1b.

[0019] As shown in drawing 5, the stripper 20 (20B) of the powder coatings from the hub hole 1j front face of an aluminum wheel 1 The hollow cylinder section 27 which is connected to the reduced pressure pump (vacuum pump) 22 through a hose 21, is supported by the robot 19, and is inserted in hub hole 1j of an aluminum wheel 1 rotatable and by which the tip was blockaded, the slit 28 formed in the hollow cylinder section, and the brush 29 attached in the external surface of the hollow cylinder section 27 -- since -- it becomes. As shown in drawing 5, the stripper 20 (20B) of powder coatings may have further the slit 31 formed in the hollow arm 30 and the hollow arm 30 of the pair by which the interior of stretch is connected to the reduced pressure pump (vacuum pump) 22 through a hose 21 in the direction which intersects perpendicularly to the hollow cylinder section 27, and the brush 32 attached in the external surface of the hollow arm 30.

[0020] Since hub hole 1j of an aluminum wheel is already understood from the bolthole 1i location, it inserts the hollow cylinder section 27 of the stripper 20 (20B) of powder coatings in hub hole 1j with a robot 19, and rotates the hollow cylinder section 27 with a robot 19. At this time, the powder coatings with which the brush 29 has adhered to hub hole 1j are dropped from 1f of hub surfaces with hole, and it absorbs and removes in the hollow cylinder section 27 through a slit 28. The attracted powder coatings are collected and reused. When the stripper 20 (20B) of powder coatings has the hollow arm 30 and it rotates along 1h of hub contact surfaces whose hollow arm 30 is 1g of disk tooth backs, the powder coatings with which the brush 32 has adhered to 1h of hub contact surfaces are dropped, and it absorbs and removes in hollow Anu 30 through a slit 31. The attracted powder coatings are collected and reused.

[0021]

[Effect of the Invention] Since according to the stripper of the powder coatings from the aluminum wheel hole front face of the removal approach of the powder coatings from the aluminum wheel surface with hole of claim 1 - claim 3, claim 4, and claim 5 the powder coatings applied to the aluminum wheel hole front face are baked and suction removal is carried out in front, an aluminum wheel can be attracted where an axis is leveled and the posture modification process for turning the axis of an aluminum wheel to a vertical like [ in masking ] and the robot for it are not needed. Moreover, since masking is not used, there is also no problem of omission of a masking member, the painting defect of the part of the shadow of a masking member, and the poor omission of a solvent coating.

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[Translation done.]